



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: PW1133GA-JM BYPASS RATIO (-): 11.6
 UNIQUE ID NUMBER: 01P18PW156 PRESSURE RATIO π_{co} (-): 38.1
 COMBUSTOR: TALON X, Block-C
 ENGINE TYPE: TF RATED OUTPUT F_{co} (kN): 147.3

REGULATORY DATA

CHARACTERISTIC VALUES:	LTO_{mass}/F_{co} (mg/kN)	LTO_{num}/F_{co} (particles/kN)	NVPM MASS CONCENTRATION ($\mu\text{g}/\text{m}^3$)
LTO/ F_{co} AND MAX nvPM _{mass}	126.5	2.52E+15	3051
AS % OF CAEP/10 LIMIT	-	-	55.7
AS % OF CAEP/11 LIMIT (InP)	8.5	25.0	
AS % OF CAEP/11 LIMIT (NT)	54.3	84.2	

MEASURED DATA

MODE	POWER SETTING (% F_{co})	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK nvPM _{mass} ($\mu\text{g}/\text{m}^3$)
				EI _{mass} (mg/kg)	EI _{num} (particles/kg)	
TAKE-OFF	100	0.7	1.023	93.3	7.08E+14	
CLIMB OUT	85	2.2	0.839	70.8	9.57E+14	
APPROACH	30	4.0	0.278	6.9	4.25E+14	
IDLE	7	26.0	0.099	7.0	6.65E+14	
LTO TOTAL (kg, mg, number of particles)			375	13399	2.67E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/ F_{co} VALUES (mg/kN, particles/kN)				91.0	1.82E+15	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$)				93.3	9.64E+14	2371

* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% F_{co})	CORRECTED EMISSIONS INDICES	
		EI _{mass_SL} (mg/kg)	EI _{num_SL} (particles/kg)
TAKE-OFF	100	109.7	1.77E+15
CLIMB OUT	85	87.9	3.58E+15
APPROACH	30	9.8	3.36E+15
IDLE	7	14.4	6.59E+15

AMBIENT CONDITIONS

	From		To	
	BAROMETER (kPa)	100.8	103.0	HEAT OF COMBUSTION (MJ/kg)
TEMPERATURE (K)	266.7	277.2	HYDROGEN CONTENT (%mass)	13.84
HUMIDITY (kg water/kg dry air)	0.0004	0.0017	AROMATICS CONTENT (%vol)	15.3
			NAPHTHALENE CONTENT (%vol)	1.87
			SULPHUR CONTENT (ppm by mass)	705

MANUFACTURER: Pratt & Whitney
 TEST ORGANIZATION: Pratt & Whitney
 TEST LOCATION: East Hartford, CT
 TEST DATES: 02/03/2017-04/03/2017

REMARKS

1. Data from certification report PWA-12243
2. 1 engine tested
3. TALON-X, Block-C* combustor
4. Certification in accordance with ICAO Annex 16 Vol. II., Part III, Chapter 2.
5. nvPM levels in accordance with ICAO Annex 16 Vol. II, Part III, Chapter 4 and Appendices 7 and 8. (CAEP/10)